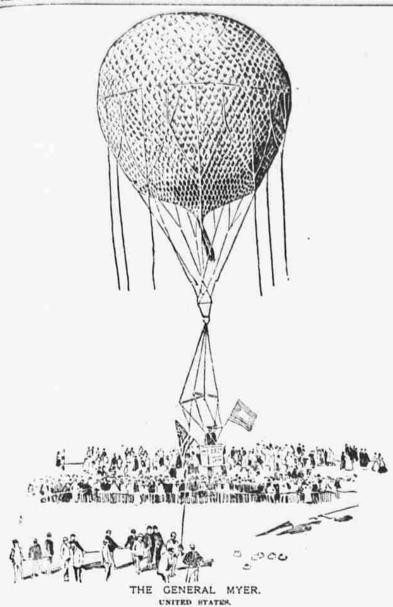
MODERN WAR BALLOONS. loons as a means of reconnelssance were made in the French revolutionary wars, in hapoleon's Egyptian expedition, and again in the Sardinian campaign of 1859. But the balloon as a practical factor in war dates from 1861. At the outbreak of the war between the States, Mr. Lincoln summoned to Washington for consultation the aeronaut Citil War, 1 sed Balloons, and Thought Them | Thaddens Lowe, who afterward accompanied the Army of the Potomac in several campaigns with his balloon. About the same time James Allen of Providence, R. I., another aeronaut with two balloons, volunteered his services to Gov. Sprague, which were accepted, and he accompanied the first call of seesary to every General commanding in war. | three months men into the field.



However numerous, brave, and excellent his my may be, yet, without this information, he lke Polyphemus of old-strong, but blind. Calanet wars are a thing of the past; herefter, war will mean the movements of nations arms. In addition to laying tribute on all milable physical force, war now presses into service nearly every scientific discovery.

cience plays its most important part in facili-

sing the collection and transmission of inforstien in the field. The next great war will present many appli-ations of recent inventions, hitherto unknown the battle field. Prominent among these all be the military balloon, for the purpose of rving the enemy's position and numbers. beerver, at an altitude of several thousand will telegraph or telephone his reports dis to the commanding General, make rapid sches of the ground and the enemy's posion, and, by means of instantaneous photograit, side i by a new appliance called a telobjecm, which magnifies objects at a great distance s to bring on rainute details, he will be able furnish in a short time numerous photophs with which to illustrate the report of

position and strength which he has just

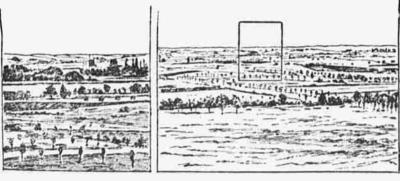
The Aeronautical Corps seems to have bee a semi-civic volunteer institution, with no definite military status. Each balloon train. in immediate charge of its professional aero naut, was accompanied by an officer with detail of soldiers, who acted as escort and

general assistants to the aeronaut.

Illuminating gas was used in becausensions from the defences of Washington; in the field, hydrogen. This gas was generated to iron tanks, carried on wagons, by treating iron turnings with sulphuric acid. The balloons were all of the captive class-

that is, made fast to the ground. No ascensions greater than a thousand feet were made as that was the length of the longest cabl used. But this was sufficient to command a view of all_the inequalities of ground occupied by the enemy. No observations from free flight, sailing over the enemy, seem to have been attempted.

At the very outset of the war, the malerial of the balloon train was excellent compared to that of the rest of our equipment. Its v-hicles were as mobile and handy as any of th general transport. The corps could inflate and make ascensions wherever the army could march. Yet as a practical means of recon-

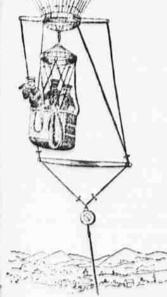


THE WORK OF THE TELOBJECTIVE.

LIEFT-HAND PICTURE IS AN ENLARGEMENT OF THE RECTANGLE IN THE RIGHT-HAND PICTURE Is ancient times men built watch towers at | noitring the system was almost a total failest expense from which to watch any hostile much. But the beights reached and the two years of bungling experiments. mand of view obtained were comparatively call. Science in the last few years has given a means of suddenly mounting to great ele us, from which every foot of ground witheach of the most powerful field glasses can early seen. Formerly Generals could cortheir reserves and supports behind the retelopes of hills and ridges, but now all such itions are as visible to the observer in the on as if paraded on a hocizontal plane.

very General in battle must think and exthis thoughts and intentions by the move of his battallons and batteries. If he this to attack or to retreat, to turn a flank, break a centre, he must dispose his troops To the trained and skilled staff looking down on the field, a study of e dispositions is an accurate revelation of her thoughts and intentions of the enemy. diately telegraphs them to his comer, who may parry the blow and deliver Stroke.

borly in late years that the advance it ister and the production of serviceable light fabrics have rendered practicable



SIAN MILITARY BALLOON. alloons in war. Yet the subject short history which is particularly into Americans; for we are the first he to make a practical use of war balloons. successful attempts to make use of bal-

ure, and was abandoned after little more than

This fallure was due entirely to the lack of a corps of competent, thoroughly instructed military observers. The impression seemed to prevail that aeronauts constituted a new and highly scientific close corporation, and that they, and only they, could make observations properly from a balloon in the air. As a matter of fact, the aeronauts were destitute of any military instruction or experience. They did not understand what they saw, and from their ignorance of military terms"and words could not describe intelligently even what they omprehended. When they saw a body of the enemy, they did not know whether it was a company or regiment, a brigade or a corps, And as for divining the intentions of the enemy from his formations and movements, this wa naturally entirely beyond them.

Gen, Fitz John Porter and Lieut, Comstock of the Engineers were both excellent observ ers. They were officers of unusual ability, and levoted themselves with energy and zeal to acquiring the accessary knowledge and experience. Both frequently made reports of great value, but whenever anything of unusual importance occurred, as the enemy' movements on the eve of a battle, a professional aeronaut usually ascended to observe.

The last appearance of a balloon in the wa was at Chancellorsville, where Lowe ascended He dates his report "Balloon in the Air, May 1, 1803, 2:15 P. M." After a confused and hazy description of the field, in which he mentioned great volumes of smoke, and alluded to the probability that large bodies were engaged on both sides, he closed with these words: "This would be a good time for some staff officer to ascend, if it is desirable to you. In this sentence he clearly admits his inability to report what he saw. This is a striking example of the folly of experting clear and reliable reports from untrained observers.

Gen. E. P. Alexander of the Confederate army says: "I never understood why the en-emy [Federals] abandoned the use of military alloons early in 1863, after having used their extensively up to that time. Even if the observers never saw anything, they would have been worth all they cost for the annoyance and delays they caused us in trying to keep our movements out of sight."

It is of interest to note how slow the great military nations of Europe have been to utilize the lessons which our experience might have taught them. In the great wars of 1866, 1870, and 1877, neither Germany, France, nor Russia put a thoroughly organized and and absolutely cas tight. The only objection equipped balloon detachment in the field. But of late years there has been a great swakening to the importance of this subject. Now, every first-class military power has equipped electricity from the clouds, acrostatic parks, and is busy in developing a Silk being a highly electricity from the clouds.

systems of both captive and dirigible balloons for use in war.

The material of a balloon detachment in war consists of these elements: "The balloon, of different fabrics and forms in the various nations-Each detachment usually carries two balloons, one as a reserve in case of accident; (2) the wagon for transporting the balloon; (3) the wagon for the cable, with the reel on which it is wound (in some services the balloon and cable wagons are combined; in others they are separate, and (4) the wagons for transporting the inflating gas, which is hydrogen in all services. It is compressed under great pressure and carried in steel tubes. These tubes discharge by means of a stop-cock into a main corper tube for each wagon. The gas is then convered by a system of hose into the balloon. There are two systems of furnishing gas in the field. One is to carry it in the steel tubes, after it has been made in a depot or purchased from chemical works in which hydrogen occurs as a by-product from some commercial chemical; the other to make the was in the field in a generator carried in a special wagon. This latter system is open to the objection that the generator wagons are very heavy and difficult to

transport over any but the best roads, Then there is (5) the basket or car, in which are carried field glasses, or telescopes of great power, the instantaneous photographic apparatus, telegraph and telephone instruments, barometer, and appliances for making outline maps and writing reports.

In some services the telegraph and telephone wires are contained in the cable; in others, they are independent of it.

Several bicycles are generally attached to a balloon detachment for couriers and scouts. Carrier pigeons sometimes form part of the equipment of a deput. In case a fort or garrison is surrounded and besieged, the balloons going out will take several pigeons and send them back to the beleaguered garrison with orders or news. The balloon depots are in a certain sense

chools of instruction for both officers and men in case of war.

The personnel of a balloon depot usually consists of the commanding officer, a company on a peace footing, several instructors, and a number of young officers undergoing instrucof these remain on duty more than two or three years. A stream of instructed officers and men is passing through the depot. Their names are kept to be called on in time of war.

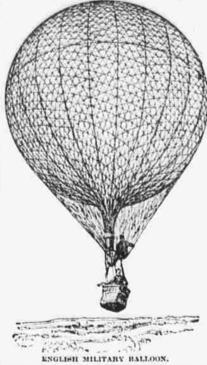
The nations which now have balloon depôts and are prepared to send detachments into the field are France, Prussia, Great Britain, Russin, Austria, Bavaria, Italy, and the United

THE FRENCH SYSTEM.

France has in some respects led the march of progress in regard to aerostatics. The first balloon ascension was made by the brothers Montgolfler, near Paris, in 1793. The first effort to utilize practically captive bal-

comes dangerously so when treated with rubber. Some years ago s serious accident oc-curred with a balloon made of silk and rubber. When it was brought to the ground and the men put their hands on it, they received a violent shock. A moment later the envelope burs into flames and the gas exploded. One man was instantly killed and five men serious ly wounded. This is the only fatal accident which has so far occurred at this park.

The regulation field balloon of 500 cubic matres con ents costs, complete, \$1,250. It is spherical in shape and is called the ball balloon in contradistinction to the kite balloon. It



works well in light winds, but cannot be used in winds of more than twenty miles an hour. tion as scientific and practical observers. None In some winds it rises with difficulty and is fre quently thrown downward for many feet before recovering itself. It is also liable to spin about its vertical axis to such an extent as to render observing difficult or impossible. These disadvantages are common to the spherical balloons of all services.

The hydrogen gas used for inflating is car ried in steel cylinders, one metre long and forty centinetres in circumterence, at a pressure of 150 atmospheres. It is purchased in chemical works in different parts of Germay, in which hydrogen occurs as a by-product. It costs 10 cents per cubic metre, at a pressure of 150 atmosuheres.

Three years ago there was an explosion of loons as a means of reconnoiseance was made gas at the depot. Several hundred of these by the Revolutionary Government in 1794, cylinders, filled, were piled like cordwood near rect military conclusions from imperfect ob-

loon, the invention of Lieut, von Siegefeld, has been lately introduced, and is the best military captive balloon yet devised. Its principal parts are the cylinder, with hemispherical extremities, the steering sack, and the tackle for suspending the basket and at-

taching the cable, The steering each, shown in place 1. fille itself automatically with air when the balloon rises. Its function is to keep the balloon

always with the head to the wind, A characteristic feature is the absence of netting, which greatly reduces the weight to he sustained. A broad last of heavy sailcloth passes around the balloon a little below and parallel to its longer axis. To this belf two independent systems of cordage are attached. The one supporting the basket is red; the cable system is blue. The lines to the valves are red and blue.

This balloon made its first appearance in

the autemn managures of 1894, when it was described by our Military Attache at Berlin.

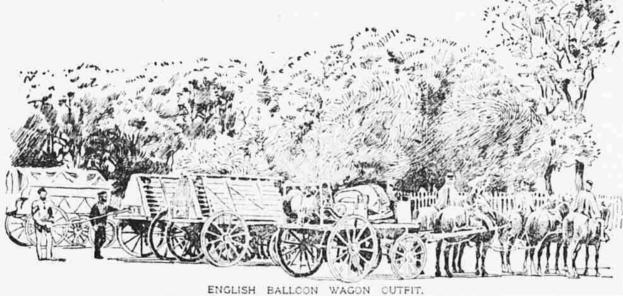
Its advantages are: First, that it-rises in any wind; the weights are so adjusted that the long cylinder floats at an angle of about twenty degrees to the horizon, with the head up; the wind, acting on the lower surface, causes the balloon to rise on the same principle that a kite rises. Secondly, that it is never thrown downward, as is frequently the case with ball balloons; that it can be used in winds with a velocity as high as sixty miles an hour; that it does not spin, but lies seadily in the wind, like a ship at anchor in a current.

This balloon has been greatly improved since its first appearance in the field. The latest improvement is the addition of a small auxillary balloon, with kite-tail attachment. The object of this device is to increase its steadiness in high winds. Lieut, von Siegsfeld has also devised several smaller balloons on the same model, to be used for supporting electric rights for signal purposes and for sustaining neteorological instruments at great elevations These would be very useful for fleet signalling in the navy. The German balloon park, or "Air Ship Di

vision." as it is called, was organized in 1885. It is attached to the railroad trigade, and is directly under the orders of the chief of the great general staff. Its personnel consists of one field officer as commandant, one complete company on a peace footing, two instructors in observing, and cleven officers under instruction as observers.

The course of instruction is divided into physical and mental. In the first the officers are practised in making ascensions in all kinds of reather. Some men can never accustom themselves to the swaving and spinning of a balloon in high winds. They become violent'y seastck and incapable of observing anything Such men are promptly sent back to their regiments and replaced by others with stronger heads and stomachs. In the mental instruction the officers must

study the march and battle termation of all military nations and must learn to deduce cor-



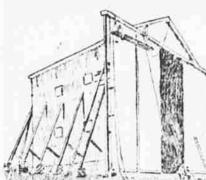
ganized. One of these, commanded by Capt. Coutelle, was at the battle of Fleurus. He seended to a height; of 1,500 feet, and succeasfully reported the strength and movements of the Austrian army to the French

without being seen.' It is strange that after this successful experiment the balloon took no part in the cam paigns of Napoleon or in the Crimea. Sixty five years later, it reappeared in the Italian campaign of Napoleon III., but seems to have been forgotten again in the disastrous war with Germany. The use of balloons in siege of Paris belongs more to the domain of the postal department than to military reconnoissance.

France is now thoroughly alive to the importance of military ballooning." She main tairs perhaps the largest and most expensive aerostatic park in the world; but, unfortu-nately for the inquisitive, the entire establishment is guarded with the utmost secreey.

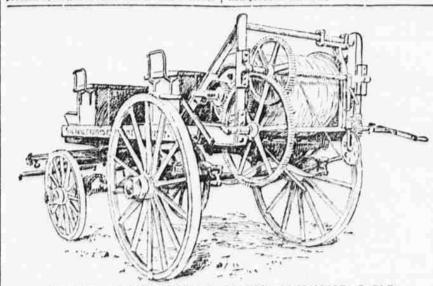
In war each important fortress and each army corps will have a balloon detachment, The French balloon is made of silk, coated with a varnish whose composition is secret. The basget is swung on the trapeze system, between two wooden spars. This method of swinging is supposed to diminish swaving and spinning. Russia and the United States follow the same system. Great Britain and the nations in the Triple Alliance suspend the basengine. This and the gas generator on good roads. The French also have introduced lately the system of carrying compressed hydrogen in steel tubes. The observer | tion parks of the army

when two companies of aeronants were or the barracks in charge of a sentinel. Early in servations. For instance, the enemy's intenthe morning. while a high wind was blowing. without any apparent cause, the entire pile of formations of his infantry, cavalry, artillery cylinders exploded with a fearful report, causing the ground to quake, shaking houses and | should be able to tell if the enemy intends to breaking windows at a considerable distance. General. He says in his memoirs: "The bal-loon had a demoralizing effect on the etemy, injured, though the fragments of the cylinders what may be of value or interesting to the comwho came to the idea that he could do nothing | were thrown with great force for several hun-



BALLOON HOUSE.

UNITED STATES. dred vards in every direction. So far as the public knows, no satisfactory explanation for this remarkable explosion has ever been found. There are eight wagons in a field balloon detachment. One for the balloon, one for the reel and cable (the reel is worked by hand by ket directly from the iron ring to which the net is made fast. The reel is worked by a reeled until twelve or fifteen minutes); and six In peace (twelve in war) for gas. Each wagen wagon are very heavy, and can be used only carries twenty cylinders. Six wagon loads of gas are necessary to fill the balloon. Reserve appplies of gas are carried with the ammuni-



BALLOON WAGON SHOWING DOUBLE CONDUCTOR CABLE.

is connected with the ground by telegraph and telephone wires wound with the caple. HOW PRUSSIA WORKS.

balloon p rk of the Prussian army is In Berlin. It is intended to furnish each independent army in war with a field balloon dotachment.

The balloon is made of a special fabric, composed of two thicknesses of cotton cloth. coated Swith rubber. It is strong, durable, which can be urged against it is its weight. It is the heaviest fabric used for this purpose. cossesses the advantage of not attracting

Silk being a highly electric substance be-

Instantaneous photography is applied exter sively in military ballconing. Photographs taken verti ally downward are fairly good map the scale of which can be easily worked out The method of taking photographs from the miloon is ingenious. A small camera is serewed to the stock of a gun with a hammer lock. The observer puts the stock to his shoulder sights on the object, and makes the exposure

by puilled the trigger.

A pleture of the monument to the peror William was taken with a telescope objective. It is said that pictures taken with this instrument will show the details of a fortress, number and position of guns, &c , at

distance of six miles in addition to the ball balloon, the kits bal-

tions may often be close'y surmised from the and train. From such data a good observer fight where he stands, advance, or retreat. They are carefully instructed to report only manding General, and in wording reports according to uniform, accepted system, so as to nate mistakes as far as possible. Ail the vehicles are modelled after artillery ticable for field batteries.

carriages and can work over any ground pra-The most salient_features of the Germa-Palloon Corps are the lightness and mobility

of the carriages and the great care and thou oughness_with which the observers are se leated and instructed. In these importan particulars it probably excels all other armies. GREAT BRITAIN WAR BALLOONS, The balloon department of Great Britain i at Aldersho , under the Royal Engineers. The

balloon is made of goldbeater's skin, which is made from the s'omach of the ox, dressed and prepared by a secret process. It is the lightest and to some respects the best material for balloons, but it has the disadvantage of being evpensive and very parishable. It canno stand exposure to had weather and rough use in the field. The balloon is spherical. The basket is suspended directly from the ring.

Compressed hydrogen for inflation is carried in long steel tubes. The balloon and hand reel are carried in the

same wagen.

The English material and organization are excellent. The English intend to make excensive use of balloons in future wars. Their balloon detachment is frequently used in manoeuvies at Aldershot and in other parts of the This is an important feature, as it gives the observers'an opportunity of learning their business practically.

RUSSIA'S BALLOON CORPS. The imperial order establishing the Russian acrostatic park is dated May 4, 1800. This order is worked out in intuite detail, under fifty-se on headings, covering the material and personnel of the balloon corps.

The Russian balloon is made of silk coated with varnish. It is larger than the Prussian balloon and carries two and sometimes three men. The balloon and reel wagons are ser arate. In the field hydrogen is supplied from a generator wagon. All the vehicles are unusually heavy and will protably be very difficult to transport in a country so poorly supplied with good roads as liuwin.

The basket is bung on the trapeze principle. The aerostatic park is directly under the direction of the electric section of the Enginee Corps and is divided into fortress and field de techments.

The order specifics that one of the object of the park is the theoretical and practical training of officers temporarily attached to it in accestatic duty. Eight officers, Captains or Licutements are constantly under instruction for a period of one year. In addition to these the comman ling tienerals of districts comprising balloon detachments may, in their discretion as observers. A list of all officers who the War Ministry, from which to select for detail in time of war, and it is forbidden to detall officers for this duty who have not served with the park in time of peace. This regulation shows how fully Hussia appreciates the recessity of a corps of trained and instructed begreers in war.

The balloon park of the Italian army is under the Engineer Corns.

The balloon is made of China silk, coated with virnish. It must have the power to ascend and descend 500 meters in ten minutes. The general features of both material and personnel are similar to those described.

Austria and Eavaria bave well established

as these of other European nations. UNCLE SAM'S WAR DALLOONS. The United States have the vouncest war balloon establishment in the world. It was organized by an order, dated headquarters of the army, June 8, 1892. It is directly under the Chief Signal Officer and is part of our fiying

balloon; parks, organized on the same principle

field telegraph train.
Our balloon detachment made its first apcearance at the Chicago Exposition, where it attracted nuch attention. The first balloon was called the General Myer, after our first signal officer, who devised the code of visual signals and organized the corps, both of which proved themselves most efficient during the war. This balloon was made of goldbeater's lous condition. We are just where we were

this unique distinction, and get some men. If Congress will not legislate them, probably the line of the army, who do the dirty work of marching, killing, and being killed, might lend them.

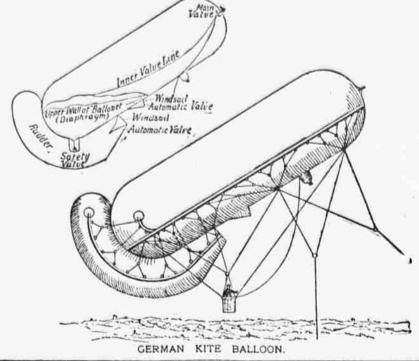
The next question is, how we are to supply the necessary corps of trained and instructed observers in war. As yet, this question has not been considered. It is important to have a good gun, but "the man behind the gun"

tainly the only one without privates.

it is going to handle balloons it must abandon

must not be forgotten. The entire subject of organization, personnel, selection and instruction of observers for

our balloon detachments is as yet in a nebu-



years it rotted to such an extent as to become unserviceable. This experience will probably result in the shandonment of this material. The balloons lately ordered and now in use are made of silk.

After the Exposition the balloon park was established at Fort Riley, Kan. But this locality was soon abandoned because of the prevailing high winds, which rendered ascensions im practicable for many days in the year. The park is now located at Fort Logan, near Denver. Col.

The permanent plant consists of, an apparatus for generating hydrogen gas from zinc or iron turnings by the use of sulphuric acid, the compressor for forcing gas into the tubes at a pressure of from 100 to 100 atmospheres, and the balloon house, a building large enough to contain an inflated balloon. In this way a halloon may be used for many days without refilling, and at the same time pe protected from the weather.

The material for the field consists of the bal-

loon, of about 13,000 cubic feet contents, the hand reel and 2,500 yards of wire cable, and the steel cylinders for the compressed gas. Each cylinder is eight feet long and has the contents of one cubic foot. The telegraph, telephone, and photographic instruments. The basket is suspended on the trapeze prin

ciple, and is an improvement on both the French and the Russian systems. Six wagons are required to transport the ma-terial. One is for the balloon and reel, four wagons for gas. Each wagon carries thirtyfour of the steel cylinders. It requires the gas

from three wagons to inflate the balloon. The

fourth is held in reserve to replenish leakage.

The escort wagon contains the spare balloon and the various tools and implements. The wagons are all of the pattern known as the "army escort wagon," slightly modified according to their special uses.

The use of the army wagon is a great advan-

tage, as in case of war disabled wagons can be replaced from the quartermaster's train. The personnel of the field detachment, as proposed by Capt. Glassford, consists of:

skin. After being in use a little more than two | in 1861. We have balloons, gas, and wagons, or are in a fair way to get them; but the im portant point of providing the man behind the gun-more properly, the man in the balloon-has received but little attention. It will not do to defer these questions until war is upon us, The more complicated and scientific war becomes, the more difficult it is to devise means to meet its entgencies.

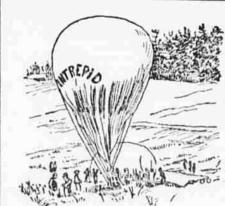
We are unique among nations in that the vital question, What shall constitute a war footing for our army, has never been considered or settled by our Government. If we went to war to-morrow no man in or out of the Government could say what number of men shall constitute a company, troop, bat-ters, regiment, or any of the higher units of command for our army in war. Yet on the definite settlement of these primary figures of organization must depend the arrangement of all the indispensable supply departments, viz., ordnance, quartermaster's, commissary's, and medical.

To return to the particular question of a balloon detachment on a peace footing. It should be under a signal officer, who should have under him one company of three officers and the r gulation number of men. There should be besides an officer as theoretical and practical instructor in observing, and a number of Lieutenants under instruction.

These officers should be detailed from the line only for periods sufficient to perfect them in a knowledge of their particular duties. only officers who take a special interest in this ducy should be detailed.

A special course of observing might be made a part of the instruction at the infantry and cavalry school at Fort Leavenworth, where the largest number of officers at any one post in the army is to be found. A balloon detachment. If not stationed permanently at Fork Leavenworth, might make annual visits to the school of sufficient length to allow the student. officers an opportunity for practical experience

The cost of a fully equipped balloon detachment is considerably less than that of a light



vastly greater.

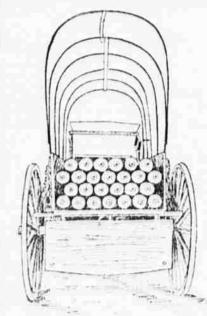
LOWE'S BALLOON

One signal officer, in command of both field | battery, but its usefulness in war might be and telegraph train and salioon detachment. One Lieutenant. One aeronaut.

Three signal sorgeants. Twelve or more privates. (There are no

privates in the Signal Corps. Our balloon park is under Capt, W. A. Glassford of the Signal Corps. He is an officer of known ability, who has devoted himself to his task with zeal and industry. has visited France and England, and studied their balloon systems as far as possible.

The balloon tasterial which the Signal Corps has adopted is excellent. In some respect), improvements have been made on European methods. It is to be hoped that we



TUBE V 460N, LOADED WITH GAS TUBES.

will give the German kite balloon and the cotton rubber-coated fabric at least a trial. All that is needed is a liberal appropriation from Congress. With sufficient money, the Signal Corps can be relied on to furnish as good material as the world affords.

But who is to handle these interesting scientific appliances when we go to war! The entire question of military ballooning is as signed to the Signal Corps by order. But by a curious eccentricity of our organization and laws, that corps has no privates. It is composed entirely of commissioned officers and sergeants. It is probably the most exclusive military organization in the world, and cer-

LOWE OBSERVING THE BATTLE OF SEVEN PINES

VULNERABILITY OF BALLOONS. ceneral impression prevails that baloons will be in great danger of being destroyed by the fire of the enemy in war. This is a mistake. A balloon in the air is a very diffi-cult target to hit. Captive balloons in war will generally be attacked by field artillers firing shraonel. At short ranges, if the balloon is allowed to fly high, the guns cannot be elevated sufficiently to reach it. The same is equally true at long ranges, when the gur must be elevated to nearly its limit to get the range. A balloon at these ranges, several thousand feet in the air, is entirely out of reach. The difficulties of striking a balloon are greatly increased when it is kept in motion. If the cable wagon be constantly driven in any direction and the reel worked at the some time, so as to play the balloon up and down through a distance of several hundred feet, the artillery will have a very difficult target to hir.

Even when struck by artillery projectiles. balloon does not come down with a rush, but settles gradually to the earth, and in most instances the observer in the Lasket, unless astually struck, would not be hurt.

A great number of experiments with artillers fire against captive balloons have been tried in the last few years. As the result it may be stated that a balloon is safe at a distance of four thousand pages, a little over two miles, and at an elevation of eight hundred vards.

A trained and skilled observer, with the best glasses, can distinguish the three arms and roughly estimate numbers, in ordinary weather, at from eight to nine miles. Hence, after keeping out of range, the observer can see six or seven intles in the rear of the enemy's advance artiilery.

おいません

In an experiment in England, a balloon an-In an experiment in England, a balloon anchored at short range and low elevation, under conditions most favorable to the gun, was struck by tragments from two strangeland lifty-six holes were made in the envelope, some of them, is large as a man's head. The balloon saw slowly and all not reach the ground until twenty minutes after receiving these rents. In thermany an infanity company, 250 men, attacked a balloon at an elevation of 100 yards. It even to the ground in lifteen minutes and had three thousand holes in the envelope, represently gubout lifteen hundred hits. Each built probledy made two hole.

Holes in a valionatan be marted on promptly on the spot and loss of gas replicibled from

n the snot and loss of mas repleciabled from the wagons, so that it need not necessarily re-name out of use for more than a few minutes. As for the observer when exposed to artillery re he is probably safer in the backet than when in terra firms. At all events, he cannot expect to have he life insured in a battle any more han his consider. then his countiles.

Frederick the Great sives as a war maxim:

You cannot pay too much for a good apy."
We can say to is with equal truth to-day: We can tay too much for the best possible system of military ballooning. Captain Twelfth Infantry, U. S. A.